

MEMORANDUM



MWH
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To: Mike Rowe (IDEQ)

Date: May 1, 2008

cc: Barry Koch, Bob Geddes, Paul Stenhouse (Monsanto)

From: Colin Duffy and Bill Wright (MWH)

Subject: 2007 & 2008 Surface Water Monitoring Plan—Revisions for Spring 2008 Sampling

INTRODUCTION

This technical memorandum is being submitted as a deliverable under the Consent Order/Administrative Order of Consent for the Performance of Site Investigations and Engineering Evaluations/Cost Analyses (EE/CAs) at P4 Production, L.L.C. Phosphate Mine Sites in Southeastern Idaho (08/20/03), EPA Docket No. CERCLA-10-2003-0117. This technical memorandum is intended to be inserted as Attachment F into the 2007 and 2008 Surface Water Monitoring Plan (SWMP) (MWH, 2007). Updates to the SWMP include: personnel changes, added sampling stations, and an updated analyte list.

Personnel changes and modifications to MWH's organizational chart (Figure 1-1) and field contacts table (Table 6-1) have been revised and are presented below.

Revisions to the SWMP also include the addition of three stream headwater stations that were not sampled during the 2007 sampling regime (MST059, MST060, and MST061), but will again be sampled in 2008. These stations have been added to a revised version of Table 4-1, also presented below. There is now a total of 88 surface water stations that will be sampled in 2008.

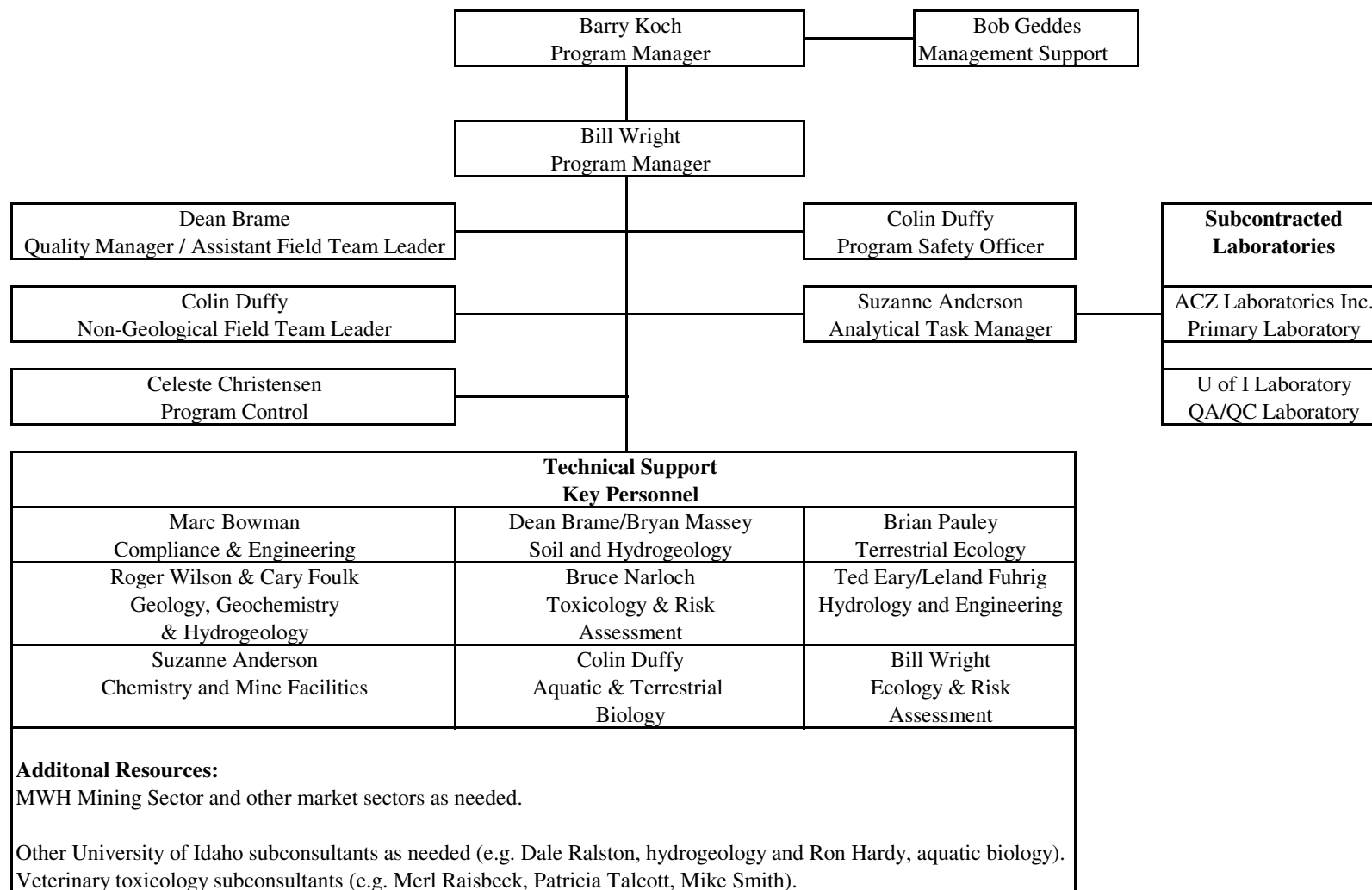
Surface expressions of groundwater (SEGW) will again be sampled independently during this event. Table 4-1 has also been modified to denote which surface water stations also serve as SEGW stations. Groundwater stations have a modified set of analytes which have come from recent instruction by IDEQ. These instructions have been appended to this attachment as Appendix 1. The new list of SEGW analytes has also been included as Table 1 in Appendix 2. Bolded analytes denote what will be analyzed at surface water stations, as opposed to SEGW stations.

Furthermore, figure 2-1, *2007 & 2008 Surface Water Monitoring Stations*, is being revised to include the additional 3 surface water stations. In addition, we will show all monitoring, agricultural, and domestic wells that will be sampled this season. Please refer to the *2008 Phase IIb Monitoring Well Installation Technical Memorandum – Revision 1* (MWH, 2008) for the updated well Sampling and Analysis Plan.

REFERENCES

- MWH, 2007. *2007 & 2008 Surface Water Monitoring Plans - Final, P4 Production's Southeast Idaho Mine-Specific Selenium Program*. Prepared for P4 Production. May.
- MWH, 2008. *2008 Phase IIb Monitoring Well Installation Technical Memorandum – Revision 1, P4 Production's Southeast Idaho Mine-Specific Selenium Program*. Prepared for P4 Production. April.

**Figure 1-1
Program Organization Chart**



**FSP-SWM TABLE 6-1
FIELD CONTACTS**

Company or Agency	Contact	Title	Telephone
P4 Production	Bob Geddes	Environmental Regulatory Specialist / Management Support	208-547-1234
	Barry Koch	Special Project Lead—Mining / Program Manager	208-547-1439
	Paul Stenhouse	Environmental Regulatory Specialist	208-547-1294
	Mike Vice	Mine Reclamation Specialist	208-547-1277
Degerstrom	Bob Nelson	Maintenance Facility Contact	208-574-6110
	Suzanne Young	Office Building Contact	208-574-6112
Idaho Department of Environmental Quality	Mike Rowe	Program Manager	208-236-6160
MWH	Bill Wright	Program Manager	425-602-4000 / cell: (b) (6)
	Colin Duffy	Non-geological Field Team Leader and Program Safety Officer	425-602-4000
	Roger Wilson	Geological Field Team Leader and Supervising Hydrogeologist	425-602-4000
	Dean Brame	Quality Manager / Assistant Field Team Leader	425-602-4000
	Cary Foulk	Senior Hydrogeologist / Geochemist	970-879-6260
	Suzanne Anderson	Analytical Task Manager, Technical & Field Support	425-602-4000
	Bryan Massey	Technical & Field Support	425-602-4000
	Brian Pauley	Technical & Field Support	425-602-4000
	Alex Hansen	Technical & Field Support	425-602-4000
	Valerie Chen	Technical & Field Support	425-602-4000
	Leland Fuhrig	Technical & Field Support	970-879-6260
	Celeste Christensen	Program Control	425-602-4000
Ralston Hydrologic Services	Dale Ralston	Consulting Hydrogeologist	208-883-0533
ACZ Laboratory	Sue Webber	Program Manager	800-334-5493, x110
University of Idaho Analytical Sciences Laboratory	Steve McGeehan	Program Manager	208-885-7900
	Janet Snow	Sample Receiving Contact	208-885-7081

<div>FSP-SWM TABLE 4–1</div> <div>SURFACE WATER MONITORING LOCATIONS, FREQUENCY, AND SCHEDULE</div>							
Feature [‡]	Monitoring Station ^{†, ‡}	Location		Station Number	SEGW	2007 & 2008	
		Latitude	Longitude			Spring	Fall
Angus Creek	Below No Name Creek	42 50 47.60	111 22 15.00	MST127		X	X
	Above No Name Creek and below Rasmussen Creek	42 51 07.00	111 22 29.00	MST132		X	X
	Above Rasmussen Creek	42 51 08.00	111 22 32.00	MST128 ²		X	X
	R-B&M-10, below Wooley Valley Mine	42 51 16.50	111 23 50.80	MST129 ²		X	X
Ballard Creek	Above Blackfoot River	42 48 56.30	111 30 07.32	MST066		X	X
	Headwaters	42 49 23.79	111 29 36.31	MST067	X	X	X
Blackfoot Reservoir Delta	At Blackfoot River	42 49 48.76	111 33 21.95	MRV011		X	X
	At Little Blackfoot River	42 54 42.39	111 32 02.34	MRV016		X	X
	At Meadow Creek	42 55 25.86	111 31 17.64	MRV017 ¹		X	X
Blackfoot River	Above Blackfoot Reservoir	42 49 17.80	111 33 10.58	MST232		X	X
	Below Ballard Creek	42 48 49.28	111 30 21.52	MST019		X	X
	Below State Land Creek	42 48 31.97	111 30 06.28	MST020		X	X
	Below Wooley Valley Creek	42 46 04.24	111 26 44.41	MST022		X	X
	Below Dry Valley Creek, (1997 #20)	42 47 05.00	111 23 07.00	MST023		X	X
	Above Wooley Range Ridge Creek	42 47 40.00	111 22 05.00	MST026		X	X
	Below Angus Creek	42 49 42.00	111 20 49.00	MST027		X	X
	Above Diamond Creek Rd.	42 49 27.30	111 19 20.30	MST028 ²		X	X
Caldwell Creek	Below Phosphoria Formation outcrop (1997 #62)	42 44 11.90	111 22 00.20	MST101 ¹		X	X
Dump Seeps	Enoch Valley Mine, West Dump Seep	42 52 13.00	111 24 11.00	MDS025	X	X	X
	Enoch Valley Mine, South Dump Seep	42 51 48.80	111 23 36.00	MDS026	X	X	X
	Henry Mine, South Pit Overburden Dump Seep (1997 #28)	42 51 37.81	111 26 39.24	MDS016	X	X	X
	Henry Mine, South Pit Overburden Dump Limestone Drain (formerly FD002) (1997 #29)	42 51 58.60	111 27 05.90	MDS022	X	X	X
	Ballard Mine, Pit #2 Upper Dump Seep	42 49 43.00	111 29 22.00	MDS030	X	X	X
	Ballard Mine, Pit #2 Lower Dump Seep South	42 49 43.00	111 29 25.00	MDS031	X	X	X
	Ballard Mine, Pit #2 Lower Dump Seep North	42 49 46.00	111 29 27.00	MDS032	X	X	X
	Ballard Mine, Goat Seep	42 49 51.00	111 29 26.00	MDS033	X	X	X
East Fork Long Valley Creek	Below Henry Mine	42 52 18.23	111 28 58.49	MST051		X	X
	Above Rasmussen Creek	42 51 31.70	111 23 01.40	MST143		X	X
	Headwaters	42 52 16.57	111 23 41.69	MST269	X	X	X
East Fork Short Creek	Above Short Creek	42 49 14.40	111 29 08.50	MST278	X	X	X
Henry Creek	Above Little Blackfoot River	42 53 49.69	111 29 15.31	MST052		X	X
Little Blackfoot River	Above Blackfoot Reservoir	42 49 32.50	111 18 39.90	MST234		X	X
	Immediately below Henry Mine (1997 #24)	42 53 50.60	111 29 24.80	MST044		X	X
	Above Henry Creek (1997 #23)	42 54 10.70	111 29 30.10	MST045		X	X
	Above Reese Creek	42 55 18.26	111 26 25.24	MST049 ¹		X	X
	Upstream of Henry cutoff road	42 55 41.01	111 26 33.49	MST254 ¹		X	X
Loadout Creek	Above Wooley Valley Creek	42 48 38.00	111 24 43.00	MST091 ²		X	X
Lone Pine Creek	Above spring-fed creek	42 53 50.40	111 27 17.40	MST054		X	X
Long Valley Creek	Below Ballard Mine, (ponded area)	42 50 54.00	111 29 49.00	MST050		X	X
Meadow Creek	Above Blackfoot Reservoir	42 55 28.00	111 30 53.00	MST235 ¹		X	X
No Name Creek	R-B-2, Above Angus Creek	42 51 11.00	111 22 24.60	MST137 ²		X	X
North Fork Wooley Valley Creek	Above Wooley Valley Creek	42 49 40.00	111 27 04.30	MST092		X	X
	Above Ballard Mine	42 50 28.00	111 28 34.00	MST093 ¹	X	X	X
Ponds	Henry Mine, South Pit Pond	42 51 35.37	111 27 05.63	MSP055	X	X	X
	Ballard Mine, Upper Elk Pond	42 49 28.12	111 28 53.33	MSP011	X	X	X
	Ballard Mine, Lower Elk Pond	42 49 38.93	111 28 50.58	MSP012	X	X	X
	Ballard Mine, Northeast Pond	42 50 07.38	111 28 24.56	MSP013	X	X	X
	Ballard Mine, Pit #4 Stock Pond	42 49 12.23	111 28 52.85	MSP059	X	X	X
	Ballard Mine, Pit #6 Pond	42 49 35.00	111 28 42.00	MSP062	X	X	X
	Enoch Valley Mine, South Pond	42 52 01.95	111 23 28.00	MSP017	X	X	X
	Enoch Valley Mine, Keyhole Pond	42 52 08.05	111 23 52.00	MSP018	X	X	X
	Enoch Valley Mine, Bat Cave Pond	42 52 23.94	111 24 06.02	MSP019	X	X	X
	Enoch Valley Mine, West Pond	42 52 22.00	111 24 27.00	MSP020	X	X	X
	Enoch Valley Mine, Stock Pond	42 52 10.00	111 24 21.00	MSP021	X	X	X
	Enoch Valley Mine, Tipple Pond	42 52 40.53	111 25 08.69	MSP022	X	X	X
	Enoch Valley Mine, Shop Pond	42 52 31.01	111 25 11.11	MSP031	X	X	X
Rasmussen Creek	Above Angus Creek	42 51 08.00	111 22 31.00	MST131		X	X
	M-B&M-1, below Enoch Valley Mine (1997 #38)	42 51 48.00	111 23 50.00	MST133		X	X
	Below West Pond Creek	42 52 05.00	111 24 12.00	MST134		X	X
	Above West Pond Creek	42 52 10.20	111 24 20.60	MST135		X	X
	Headwaters near Enoch Valley Mine Shop Pond	42 52 34.00	111 25 03.00	MST136	X	X	X
Short Creek	Below Ballard Mine	42 49 11.23	111 29 19.75	MST069	X	X	X
Spring Fed Tributary to Long Valley Creek	Above Long Valley Creek	42 51 52.20	111 29 04.20	MST277	X	X	X
Spring-fed tributary #1 of North Fork Wooley Valley Creek	Below Ballard Mine	42 49 56.00	111 28 10.00	MST094	X	X	X
Spring-fed tributary #2 of North Fork Wooley Valley Creek	Below Ballard Mine	42 49 39.00	111 28 05.00	MST095	X	X	X
Springs	Enoch Valley Mine, Hedin Spring	42 52 55.70	111 25 41.70	MSG001	X	X	X
	Henry Mine, Taylor Spring	42 52 02.40	111 27 04.60	MSG002	X	X	X
	Ballard Mine, Garden Hose Spring	42 49 41.00	111 29 18.00	MSG003	X	X	X
	Ballard Mine, Holmgren Spring	42 49 17.46	111 28 16.67	MSG004	X	X	X
	Ballard Mine, Cattle Spring	42 49 20.45	111 28 01.60	MSG005	X	X	X
	Ballard Mine, Southeast Spring	42 49 42.60	111 27 59.00	MSG006	X	X	X
	Ballard Mine, South of Southeast Spring	42 49 38.10	111 27 48.40	MSG007	X	X	X

FSP-SWM TABLE 4-1
SURFACE WATER MONITORING LOCATIONS, FREQUENCY, AND SCHEDULE

Feature [‡]	Monitoring Station ^{†,‡}	Location		Station Number	SEGW	2007 & 2008	
		Latitude	Longitude			Spring	Fall
Stewart Creek	Above Diamond Creek	42 41 32.15	111 12 50.64	MST236 ¹		X	X
Strip Mine Creek	Below Henry Mine	42 52 01.70	111 27 03.40	MST063		X	X
Timber Creek	Above Diamond Creek	42 42 03.50	111 11 22.30	MST237 ¹		X	X
Tributary of North Fork Wooley Valley Creek	Below Ballard Mine	42 49 30.00	111 27 45.00	MST096	X	X	X
Tributary to West Fork Lone Pine Creek	Above West Fork Lone Pine Creek	42 51 57.85	111 26 17.01	MST276	X	X	X
Tributary to Wooley Valley Creek	Between the R.R. tracks, upstream of Wooley Valley Creek	42 47 43.80	111 24 26.90	MST279 ²	X	X	X
West Fork Ballard Creek	Headwaters	42 49 34.06	111 29 50.84	MST068	X	X	X
West Fork Lone Pine Creek	Above Lone Pine Creek	42 51 59.49	111 26 21.78	MST057		X	X
West Fork Rasmussen Creek	Above Rasmussen Creek	42 51 31.00	111 23 34.60	MST274 ²	X	X	X
West Pond Creek	Headwaters, below West Pond	42 52 16.07	111 24 18.67	MST144	X	X	X
West Rasmussen Ridge Cr. #1 ³	Above Lone Pine Creek	42 53 42.39	111 26 15.30	MST059	X	X	X
West Rasmussen Ridge Cr. #2 ³	Above Lone Pine Creek	42 53 36.35	111 26 19.33	MST060	X	X	X
West Rasmussen Ridge Cr. #3 ³	Above Lone Pine Creek	42 53 31.92	111 26 23.67	MST061	X	X	X
Wooley Valley Creek	Above Blackfoot River	42 47 15.18	111 24 53.08	MST088		X	X
	Below North Fork Wooley Valley Creek	42 49 28.70	111 26 19.40	MST089		X	X
	Above North Fork Wooley Valley Creek	42 49 28.00	111 26 49.00	MST090		X	X

Notes:

SEGW - These stations are also sampled as Surficial Expressions of Groundwater

[†] Station identification for those sampled in September 1997 is provided parenthetically.

[‡] Names of water bodies in *italics* were assigned by either IMA or P4 Production, or they represent common usage of local inhabitants, and are unnamed on USGS maps. The reason for this is that most such streams are small with intermittent or ephemeral flows.

¹Stations are programmatic background and hence are not impacted by any phosphate mine.

²Stations are project-specific background and hence are not impacted by any P4 Production mine.

³Stations were not sampled in 2007, but will be sampled in 2008.

Location (GPS) coordinates use the NAD27 datum and are presented in ddd mm ss.ss format (degrees minutes seconds).

This page is reserved for Figure 2-1

APPENDIX 1 – IDEQ INSTRUCTIONS

- *Letter Re: Screening of analytes on the expanded list of groundwater analytes based on results of 2007 groundwater sampling. Mike Rowe to Bob Geddes. April 4, 2008..*
- Email Re: P4/Monsanto – Response to some of the issues raised on Monday’s conference call. Mike Rowe to Bob Geddes and Bill Wright. April 18, 2008.



STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

444 Hospital Way, #300 • Pocatello, Idaho 83201 • (208) 236-6160

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

4 April 2008

Mr. Robert Geddes
P4 Production, LLC
PO Box 816
Soda Springs, ID 83276-0816

Re: Screening of analytes on the expanded list of groundwater analytes based on results of 2007 groundwater sampling

Dear Mr. Geddes,

This letter is a follow-up to the Agencies and Tribes letter of 19 March 2008 regarding the *2008 Phase IIb Monitoring Well Installation Technical Memorandum, Revision 0*. In that letter we agreed to provide you with direction on additional sampling of analytes based on our screening of the expanded list of groundwater analytes (found in Table 2-3 of the *Draft Interim Report for Hydrogeologic Investigation, Revision 0*, and 2007 *Hydrogeologic Data Collection Activities and Updated Conceptual Models*).

The screening of the 2007 sampling results of groundwater wells is enclosed. The following sampling must be done in 2008 in addition to those analytes listed in Table 5.1 in the *2008 Phase IIb Monitoring Well Installation Technical Memorandum, Revision 0*.

- All wells need to be sampled in 2008 for fluoride, gross alpha, and gross beta.
- All wells to be drilled in 2008 need to be sampled for the usual suite of groundwater analytes (in Table 5.1 referenced above) plus the expanded list of groundwater analytes (in Table 2-3 referenced above).
- Sampling for Total Suspended Solids (TSS) should continue at all sites in 2008 to verify that proper sampling techniques were observed.
- Sampling for Total Dissolved Solids (TDS) should continue in 2008 for the following groundwater wells: MMW013, MMW014, MMW019, MMW022, MMW001, MMW017, MMW020, MMW009, MMW004, and MMW011.
- MMW009 was drilled through a waste rock dump and there is concern about the potential for contamination of the well. MMW009 should be sampled for all those analytes on the expanded list which were detected during 2007 groundwater sampling. These analytes include: arsenic, barium, boron, chromium, lead, molybdenum, thallium, total dissolved solids, and uranium.
- Sampling for magnesium should be done at all sites where geochemical typing is necessary.

The Agencies and Tribes look forward to working with you to finalize this document as quickly as possible. Please let me know if you have any questions on the above.

Sincerely,

A handwritten signature in black ink that reads "Mike Rowe". The signature is fluid and cursive, with the first name "Mike" and last name "Rowe" clearly distinguishable.

Mike Rowe
Regional Mining Project Manager

cc: Bill Wright (MWH)
Doug Tanner, Bruce Olenick (IDEQ)
Jeff Jones, Mary Kauffman, Will Frymire (C-TNF)
Jason Sturm (BLM)
Allen Ruberry (IDL)
Kelly Wright (Shoshone-Bannock Tribes)
Sandi Arena (USFWS)
Dave Tomten (EPA)
Bill Wiley (BIA)
File copy/Monsanto/Correspondence

Evaluation of Groundwater Results from *Draft Interim Report for Hydrogeologic Investigation, Revision 0* and *2007 Hydrogeologic Data Collection Activities and Update Conceptual Models* February 2008 for the Expanded List of Groundwater Analytes

The most recent data for the expanded list of groundwater analytes from P4's *Draft Interim Report for Hydrogeologic Investigation, Revision 0* and *2007 Hydrogeologic Data Collection Activities and Update Conceptual Models (2007 Groundwater Reports)* February 2008 were examined. The Expanded List of Groundwater Analytes was screened as to analytes to be sampled in groundwater wells in the future at Ballard (BM), Henry (HM), and Enoch Valley (EVM) mines.

Several sources were employed for screening levels of analytes on the expanded groundwater list that were sampled in 2007. Analytes which were not screened include dissolved oxygen and hardness. No screening levels were found for gross beta and magnesium.

Monitoring sites included both monitoring and production wells. Although seeps, springs, headwater streams, and ponds are surface expressions of groundwater, these sites are considered surface water sites and were not included in this screening of expanded list of groundwater analytes. Surface water sites were evaluated in 2007 based on data presented in P4/Monsanto's May 2006 Data Validation Report Memorandum.

Sampling for the various analytes was done spring of 2006 and spring and fall of 2007 (Table 1). Not all analytes were necessarily sampled during each sampling event at each site. These data have not been validated.

Table 1. Sampling sites and analytes sampled, 2006 (spring) and 2007 (spring and fall), P4/Monsanto mines.

Analyte	Wells	
	2006	2007
Antimony		F
Arsenic		F
Barium		F
Beryllium		F
Boron		F
Chromium	S	F
Cobalt		F
Copper		F
Fluoride		
Gross alpha		
Gross beta		
Lead		F
Magnesium		F
Mercury		F
Molybdenum		F
Total nitrite-nitrate	S	F
Silver		F
Thallium		F
TDS		F*
TSS		F
Uranium		F

*filtered sample only

Screens

Several sources were used for screening (Table 2). Most related directly to drinking water rather than groundwater. Note that the order does not indicate priority.

Two State of Idaho screens were used. The first screen was Idaho state groundwater quality standards (Ground Water Quality Rules IDAPA 58.01.11). The second screen were action levels identified in the Area Wide Risk Assessment (IDEQ 2004).

Several EPA documents were used for screening. One was EPA's National Primary Drinking Water Regulations. Also used were EPA Region IX's Preliminary Remediation Goals and Regions III's Risk-Based Concentrations, although use of Region IX PRGs has diminished in recent years.

The Agency for Toxic Substances and Disease Registry (ATSDR) did a Public Health Assessment for the Phosphate Mining Resource Area of Southeast Idaho. Screening levels for several constituents originated from this document.

Screening

Analytes are presented individually. Where both unfiltered and filtered sample results were available only unfiltered results were screened. If unfiltered results were not available, only filtered results from 2007 were used for screening. All the screens were reviewed for each analyte, but not all were considered in the decision to continue sampling for the analyte.

Analytes

Antimony

- The highest concentration of unfiltered Sb in wells was 0.0018 mg/L at MMW009. Concentrations at most other wells were below the detection limit.
- These concentrations are below benchmarks. However, sampling for Sb should continue at MMW009 as this well was drilled through a waste rock dump. It does not appear that additional groundwater sampling for Sb is necessary at other wells.

Arsenic

- The highest concentration of unfiltered As in wells was 0.006 mg/L at MMW001, which is below state standard and EPA drinking water standards and the ATSDR drinking water value for children. It is above the EPA Region III and IX benchmarks, which appear to be very low compared to other benchmarks, and the ATSDR drinking water values for adults. All other values are 0.0045 mg/L (MMW023) or below.
- Limiting the screening to state and EPA drinking water standards, it appears that sampling for As is not necessary except for MMW009 (0.0029 mg/L) as this well was drilled through a waste rock dump.

Barium

- The highest concentration of unfiltered Ba in wells was 0.29 mg/L at MMW014.
- These concentrations are below the benchmarks. It does not appear that additional groundwater sampling for Ba is necessary except for MMW009 (0.045 mg/L) as this well was drilled through a waste rock dump.

Beryllium

- All unfiltered Be concentrations in wells were <0.002 mg/L.
- It does not appear that additional groundwater sampling for Be is necessary.

Boron

- The highest concentration of unfiltered B in wells was 0.04 mg/L at MMW004 and MMW019.
- These concentrations are below most benchmarks. It does not appear that additional groundwater sampling for B is necessary except for MMW009 (0.02 mg/L) as this well was drilled through a waste rock dump.

Chromium

- The highest concentration of unfiltered Cr in wells was an average 0.0022 mg/L at MMW004 in Spring 2006.
- These concentrations are below the standard of 0.1 for total Cr and all other benchmarks. It does not appear that additional groundwater sampling for Cr is necessary except for MMW009 (0.0005 mg/L) as this well was drilled through a waste rock dump.

Cobalt

- The highest concentration of unfiltered Co in wells was 0.01 mg/L at MMW010.
- These concentrations are below the benchmarks. It does not appear that additional groundwater sampling for Co is necessary.

Copper

- The highest concentration of unfiltered Cu in wells was <0.01 mg/L at various sites.
- These concentrations are below the benchmarks. It does not appear that additional groundwater sampling for Cu is necessary.

Lead

- The highest concentration of unfiltered Pb in wells was 0.002 mg/L at MMW020 and MMW021.
- These concentrations are below the benchmarks. It does not appear that additional groundwater sampling for Pb is necessary except for MMW009 (0.0001 mg/L) as this well was drilled through a waste rock dump.

Magnesium

- The highest concentration of unfiltered Mg was 48 mg/L at MMW017.
- Mg does not seem to be a concern from a groundwater or drinking water perspective as there are no benchmarks. Therefore, it does not appear that additional groundwater sampling for magnesium is necessary except for what is needed for geochemical typing at the sites.

Mercury

- Only one well had a concentration that was not non-detect and that was MMW017 at 0.0002 mg/L. These concentrations are at least a magnitude below any benchmark. It does not appear that additional groundwater sampling for Hg is necessary.

Molybdenum

- The highest concentration of unfiltered Mo in wells was 0.04 mg/L at MMW009.
- These concentrations are below the benchmarks. It does not appear that additional groundwater sampling for Mo is necessary except for MMW009 (0.04 mg/L) as this well was drilled through a waste rock dump.

Nitrate/Nitrite

- Only two wells had concentrations of unfiltered nitrate-nitrite greater than 1 mg/L (MMW004 – 1.5 mg/L in Spring 2006 and 1.3 mg/L in Fall 2007; MMW006 – average of 1.3 mg/L in Fall 2007).
- The groundwater standard for nitrate-nitrite is 10 mg/L. It does not appear that additional groundwater sampling for nitrate-nitrite is necessary.

Silver

- The highest concentration of unfiltered Ag in wells was an average 0.02 mg/L at MMW022. All other sites had concentrations <0.01 mg/L.
- These concentrations are below the benchmarks. It does not appear that additional groundwater sampling for Ag is necessary.

Thallium

- The highest concentration of unfiltered Tl in wells was 0.0011 mg/L at MMW020.
- These concentrations are below the benchmarks. It does not appear that additional groundwater sampling for Tl is necessary except for MMW009 (0.0005 mg/L) as this well was drilled through a waste rock dump.

Total Dissolved Solids

- The Secondary Constituent Standard for TDS is 500 mg/L. MMW013 (640 mg/L), MMW014 (580 mg/L), MMW019 (520 mg/L), MMW022 (600 mg/L), MMW001 (500 mg/L), MMW017 (1000 mg/L), and MMW020 (500 mg/L) all equaled or exceeded the criterion. Three other wells were above 400 mg/L - MMW009 (410 mg/L), MMW004 (460 mg/L), and MMW011 (420 mg/L). Sampling for TDS should continue at all 10 wells.

Total Suspended Solids

- The highest concentration of TSS was observed at MMW001 at 72 mg/L. MMW011 recorded a TSS concentration of 6 mg/L. All other well sites reported concentrations less than 5.0 mg/L.
- Although there are no benchmarks for TSS, groundwater sampling should continue at all sites to verify proper sampling techniques were observed.

Uranium

- The highest concentration of unfiltered U in wells was 0.013 mg/L at MMW014 which was below the EPA MCL and ATSDR benchmarks. It is above the EPA Region IX PRG and both above and below the two listed Region III RBCs.
- Based on the maximum U concentration being below most benchmarks, it does not appear that additional groundwater sampling for U is necessary except for MMW009 (0.0047 mg/L) as this well was drilled through a waste rock dump.

Other Analytes

- Several analytes do not appear to have been sampled although they were listed in Table 2-3 (2007 Groundwater Reports). These analytes include: fluoride, gross

alpha, and gross beta. These analytes need to be sampled at all groundwater sites in 2008.

Sampling of Groundwater Wells for 2008

The following sampling must be done in 2008 in addition to those analytes listed in Table 5.1 in the *2008 Phase IIb Monitoring Well Installation Technical Memorandum, Revision 0*.

- All wells need to be sampled in 2008 for fluoride, gross alpha, and gross beta.
- All wells to be drilled in 2008 need to be sampled for the usual suite of groundwater analytes plus the expanded list of groundwater analytes.
- Sampling for Total Suspended Solids (TSS) should continue at all sites in 2008 to verify that proper sampling techniques were observed.
- Sampling for Total Dissolved Solids (TDS) should continue in 2008 for the following groundwater wells: MMW013, MMW014, MMW019, MMW022, MMW001, MMW017, MMW020, MMW009, MMW004, and MMW011.
- MMW009 was drilled through a waste rock dump and there is concern about the potential for contamination of the well. MMW009 should be sampled for all those analytes on the expanded list which were detected during 2007 groundwater sampling. These analytes include: arsenic, barium, boron, chromium, lead, molybdenum, thallium, total dissolved solids, and uranium.
- Sampling for magnesium should be done at all sites where geochemical typing is necessary.

Future Sampling

In future phases of the hydrogeologic investigation at Ballard, Henry, and Enoch Valley mines, all new wells will need to be sampled for the usual and expanded list of groundwater analytes. As Enoch Valley Mine is the youngest of the three mines, and the rate of dispersion of contaminants is unknown, the Agencies and Tribes may direct P4/Monsanto to conduct additional rounds of sampling the expanded list of groundwater analytes.

Table 2. Screening levels for analytes. Units are mg/L unless otherwise noted.

Analyte	State Standard ¹	Actions Levels ²	EPA MCL ³	EPA Secondary Standard Level ³	EPA Region IX PRG ⁴	EPA Region III RBC ⁵	Health Comparison Values of Drinking Water ⁶	
							Child	Adult
Antimony	0.006		0.006		0.0146	0.0146	0.004	0.010
Arsenic	0.05		0.01		0.000045	0.000045	0.003	0.010
Barium	2		2		2.555	7.3		
Beryllium	0.004		0.004		0.073	0.073	0.02	0.07
Boron					7.3	7.3	0.1	0.4
Chromium (total)	0.1	0.025	0.1				0.1	
Chromium III					54.75	54.75		
Chromium VI					0.11	0.11		
Cobalt					0.73	0.73	0.1	0.4
Copper	1.3	0.011	1.3	1.0	1.46	1.46	0.1	0.4
Fluoride	4.0		4.0	2.0				
Fluoride (undistilled)								
Fluoride (soluble)					2.19	2.19		
Gross alpha	15 pCi/L ^{8,9}		15 pCi/L ⁸					
Gross beta								
Lead	0.015		0.015					
Magnesium								
Mercury					0.011	0.011		
Mercury (inorganic)	0.002		0.002					
Mercury (methyl)					0.00365	0.00365		
Molybdenum					0.1825	0.1825	0.05	0.2
Total nitrite-nitrate (nitrite/nitrate)	10 (1/10)		(1/10)		(1/10)	(3.65/58.4)		
Silver	0.1 ¹⁰			0.1	0.1825	0.1825	0.05	0.2
Thallium	0.002		0.002		0.00241	0.002555		
TDS ¹¹	500 ¹⁰			500				
TSS ¹²								
Uranium			0.03		0.0073	0.11/0.0073	0.03	

B=not detected above quantitation limit but present above method detection limit

E=estimated value due to presence of interference

H=sample analyzed out of holding time

N=percent recovery not within control limits 75-125%

W=post-digestion spike recovery out of control limits 85-115%

¹State of Idaho Ground Water Quality Rule (IDAPA 58.01.11)

²for continued monitoring, Area Wide Risk Management Plan (IDEQ 2004)

³MCL=Maximum Contaminant Level, National Primary Drinking Water Regulations, EPA (<http://www.epa.gov/safewater/contaminants/index.html#rads>, 17 March 2008)

⁴Preliminary Remediation Goals, Tap Water, EPA Region 9: Superfund (<http://www.epa.gov/region09/waste/sfund/prg/index.html>, 18 March 2008)

⁵Risk-Based Concentrations, EPA Region 3, (<http://www.epa.gov/reg3hscd/risk/>, 19 March 2008)

⁶Public Health Assessment: Southeast Idaho Phosphate Mining Resource Area: Bannock, Bear Lake, Bingham, and Caribou Counties, Idaho EPA Facility ID: IDN001002245 (U.S. Department of Health and Human Services, Public Health Services, Agency for Toxic Substances and Disease Registry, 2006)

⁷Smoky Canyon Mine, Panels F & G, Final Environmental Impact Statement (USDA Forest Service, Bureau of Land Management, 2007)

⁸pCi/L = picocuries/liter

⁹includes radium -226, excludes radon and uranium

¹⁰secondary constituent standard

¹¹Total Dissolved Solids

¹²Total Suspended Solids



<Michael.Rowe@deq.idaho.gov>

04/18/2008 01:30 PM

To <robert.l.geddes@monsanto.com>,
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cc <aruberry@idl.idaho.gov>, <barry.s.koch@monsanto.com>,
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Subject P4/Monsanto - Response to some of the issues raised on
Monday's conference call

Bob and Bill,

From the Monday call there were several issues to which I said I would respond. These included: analytes to sample at MMW009; analytes to sample at MAW001, MAW002, MAW003, MAW005, and MDW002; use of specific conductance and turbidity as surrogates for TDS and TSS, respectively; simplification of the lists of analytes to sample in 2008; and, data gaps that the Agencies and Tribes have identified to date. I am in conversation with the Agencies and Tribes on the list of analytes to sample at MMW009 and data gaps. I expect to have some direction to you toward the end of next week.

Here is our direction for resolving the three other issues.

List of analytes to be sampled at agricultural and production wells (MAW001, MAW002, MAW003, MAW005, and MDW002) in 2008

The following should be sampled in 2008 at these wells: selenium; sulfate; and anions and cations needed to create Stiff & Piper diagrams for geochemical typing at these wells.

Use of Surrogates - Specific Conductance for TDS and Turbidity for TSS

TDS

Specific Conductance can be substituted for analysis of TDS if it can be shown that there is a good relationship (highly correlated and significant) between the two.

TSS

Turbidity can be substituted for TSS.

QA/QC

TDS and TSS should be analyzed at 5% of the sites sampled. TDS QA/QC samples must be taken at any of these sites (MMW013, MMW014, MMW019, MMW022, MMW001, MMW017, MMW020, MMW009, MMW004, and MMW011).

Simplification of Analyte Lists for Sampling Wells in 2008

First of all, I would like to share with you our overall rationale for determining parameter lists for various wells. The Area Wide Risk Management Plan (2004) allowed that unique conditions might be observed at individual mine sites, which could lead to tailored contaminants of concern lists (Page 4, 3rd full paragraph). In addition, groundwater studies were deferred to site-specific actions (Page 10, 1st partial paragraph). Because of this and other language we are directing all mining companies to sample for a broad range of potential contaminants at least once from each well. Then, based on the findings, the list may be reduced. Factors to consider in reducing the list include:

- 1) whether contaminant concentrations were near or above conservative risk based screening thresholds;
- 2) concentrations at seeps and springs in the area;
- 3) age of dump;
- 4) location of well relative to source area (e.g., does it penetrate waste rock); and,
- 5) other factors.

With the above in mind and your desire to reduce the number of analyte lists, here is our proposal.

- For all existing monitoring wells, except MMW009, plus wells MAW001, MAW002, MAW003, MAW005, and MDW002 – the list of analytes found in Table 5.1 (Page 12, *Draft 2008 Phase IIb Monitoring Well Installation Technical Memorandum, Revision 0*) plus necessary anions and

- cations for geochemical typing, gross alpha, and gross beta
- For all new wells to be drilled in 2008 plus MMW009 – the list of analytes found in Table 5.1 (Page 12, *Draft 2008 Phase IIb Monitoring Well Installation Technical Memorandum, Revision 0*) plus necessary anions and cations for geochemical typing and the expanded list of groundwater analytes as follows: Antimony, Arsenic, Barium, Beryllium, Chromium, Cobalt, Copper, Dissolved Oxygen (field measurement), Gross Alpha, Gross Beta, Hardness, Lead, Magnesium, Mercury, Molybdenum, Nitrogen (total nitrite-nitrate), Silver, Thallium, Total Dissolved Solids, Total Suspended Solids, and Uranium.

As the Agencies and Tribes come to agreement on direction for the other two issues, I will include the above in a letter to you. Please let me know if you have any questions.

Mike

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APPENDIX 2 – SEGW ANALYSIS

- Table 1 – Surface Expressed Groundwater Analyte List

Table 1 Surface Expressed Groundwater Analyses¹				
Parameter	Method	EDL	Reporting Units	Hold Time (days)
total alkalinity, filtered	SM2320B	2	mg/L	14
aluminum	M200.7 ICP	0.03	mg/L	180
antimony	M200.8 ICP/MS	0.0004	mg/L	180
arsenic	M200.8 ICP/MS	0.0001	mg/L	180
barium	M200.7 ICP	0.0001	mg/L	180
beryllium	M200.7 ICP	0.0001	mg/L	180
boron	M200.7 ICP	0.01	mg/L	180
cadmium	M200.8 ICP/MS	0.0001	mg/L	180
calcium, filtered	M200.7 ICP	0.2	mg/L	180
chloride, filtered	M300.0	0.5	mg/L	28
chromium	M200.8 ICP/MS	0.0001	mg/L	180
cobalt	M200.7 ICP	0.01	mg/L	180
copper	M200.7 ICP	0.01	mg/L	180
fluoride	M300.0	0.5	mg/L	28
gross alpha	M900.0	2	pCi/L	180
gross beta	M900.0	4	pCi/L	180
hardness, filtered	calculation	1.5	mg/L	-
iron	M200.7 ICP	0.01	mg/L	180
ferric iron, filtered	calculation	0.01	mg/L	-
lead	M200.8 ICP/MS	0.04	mg/L	180
manganese	M200.8 ICP/MS	0.0005	mg/L	180
magnesium, filtered	M200.7 ICP	0.2	mg/L	180
mercury	M245.1	0.0002	mg/L	28
molybdenum	M200.7 ICP	0.01	mg/L	180
nickel	M200.8 ICP/MS	0.0006	mg/L	180
nitrogen (as nitrate and nitrite), unfiltered	M 353.2	0.02	mg/L	28
nitrogen (total Kjeldahl), unfiltered	M 351.2	0.7	mg/L	28
orthophosphate	M 365.1	0.0005	mg/L	28
pH	MWH to provide field pH		pH	-
potassium	M200.7 ICP	0.3	mg/L	180
selenium	SM3114 B, AA-Hydride	0.001	mg/L	180
silver	M200.7 ICP	0.01	mg/L	180
sodium, filtered	M200.7 ICP	0.3	mg/L	180
sulfate	M300.0	0.5	mg/L	28
thallium	M200.8 ICP/MS	0.0001	mg/L	180
total dissolved solids, filtered	M160.1	10	mg/L	7
total suspended solids, unfiltered	M160.1	10	mg/L	7
uranium	M200.8 ICP/MS	0.0001	mg/L	180
vanadium	M200.8 ICP/MS	0.0002	mg/L	180
zinc	M200.8 ICP/MS	0.002	mg/L	180
notes: ¹ - both unfiltered (total) and filtered (dissolved) samples will be analyzed for unless otherwise noted. boldings - represent analytes that will also be analyzed in surface water samples. All will be analyzed as filtered except aluminum and selenium.				